



ADVANCED WINDOWS

Optimise your hard disk

A hard disk is more than just a place to dump your data. This month **Karl Wright** shows you how to configure your hard drive to make your system run smoother and your files safer

Your hard disk is all too easy to neglect. It's not an exciting component like a fast processor or a fancy graphics card; it's just a big, virtual store room where your files and programs sit when they're not doing anything. If that's how you feel about your hard disk, it's time to think again.

A badly set-up hard disk can slow down your system, increase the risk of crashes and make your data much more difficult to recover if you have a total system crash. In *Advanced Windows* this month we'll show you how to set up and maintain your hard disk to minimise the risk of crashes and keep your precious files as safe as they can possibly be. We'll also show you how to set up your disk so that it can hold more than one version of Windows.

FORMATTING A DISK

Before your operating system can use a hard disk, it needs to format it. Formatting is when the operating system creates its own file system on the disk. Windows formats the disk on which you install it during the installation process, but if you add extra hard disks later, you'll have to format them yourself.

When you plug a brand new hard disk into your system, it doesn't show up in Windows

Explorer automatically. To remedy this, right-click on My Computer, go to Manage and select Disk Management. Your new drive will appear here. Right-click on it and choose the Format option. Choose the file system you want – we recommend NTFS – and format the drive. When you reboot your PC the drive will show up in Windows Explorer and you will be able to use it.

PARTITIONING YOUR HARD DISK

Although your hard disk is a single physical storage unit, you can divide it into separate segments, each of which Windows treats as a different hard disk. This is useful because you can keep your data on a different partition from Windows. If Windows gets corrupted or damaged you can reinstall it to its original partition without affecting your precious data, which is safely stored on a different 'drive'. You can even reformat the Windows partition without disturbing your data partition.

Unfortunately, Windows alone gives you little opportunity to repartition your drives. When you install Windows it lets you choose how much space you want to give your primary partition, which is the one in which Windows is installed. If you give it just a small part of your hard disk, you can use Windows Management Console later to create new

partitions in the empty parts of the disk. As you create each partition you can specify its size.

Once you have partitioned your disk, however, that's pretty much it. You can't use the Windows Management Console to resize partitions. In fact the only way to resize a partition without using third-party disk management tools is to use a command-line program in Windows XP Professional called DiskPart (see the walkthrough below).

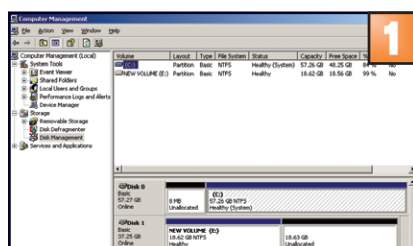
Sadly, DiskPart can extend an existing partition only into unused disk space and can't change the size of two partitions that are next to each other. You can't use it to delete a partition at the start of the disk and give its space to a partition nearer the end of the disk.

To do either of these things you need third-party software. We gave away Paragon Partition Manager 2005 on last month's cover disc. Symantec's PartitionMagic is also good. Free disk partitioning utilities are available but none of those we found that ran under Windows could resize our XP NTFS partitions – even though some of them claimed they could. Most of them ran from the command prompt, too, which isn't as friendly as we'd like.

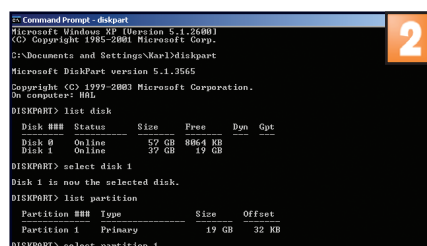
The best free disk partitioning we've seen is called Qtparted. This is a Linux application,



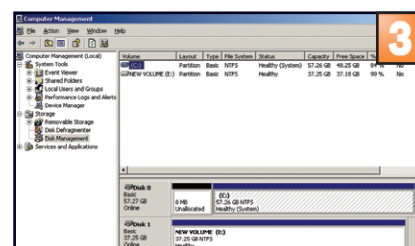
HOW TO... EXPAND YOUR DISK PARTITIONS



1 As you can see from the Disk Management Console, only half the space on Disk 1 is formatted. From this window we could create a separate partition in the unallocated space, but if this space amounts to less than 5GB there's not much point. Unfortunately the Management Console won't let us extend an existing partition into unused space. To do this we need to use the built-in Windows XP Professional tool DiskPart.

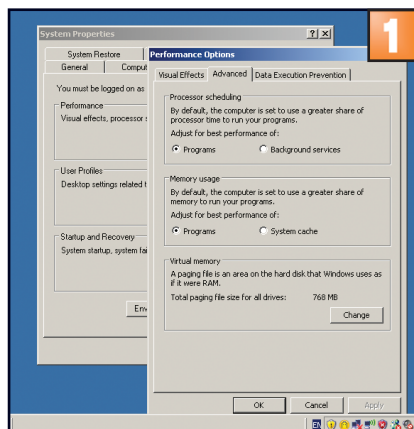


2 Go to Start, Programs, Accessories and open the Command Prompt. Type diskpart and press Enter. To see all the storage devices attached to the system, type 'list disk' and press Enter. Choose the drive you want to work on and select it. We want to work on disk 1, so the correct command is 'select disk 1', followed by Enter.

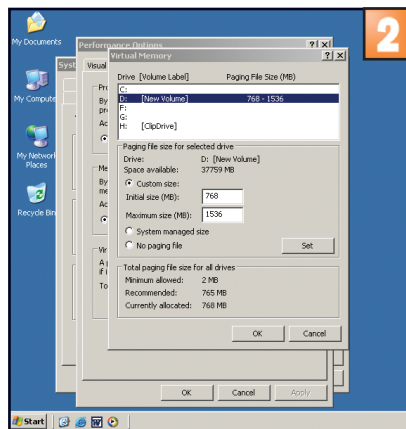


3 Now we need to find the partition we want to make larger. Tell diskpart to 'list partition' and it will list all the partitions on the selected disk. We wanted to work on partition 1 so we typed 'select partition 1' and pressed Enter. Now we simply type 'extend' and press Enter again. DiskPart will enlarge the partition until it has used up all the adjacent unformatted space on the disk. The original partition is now larger, as you can see above.

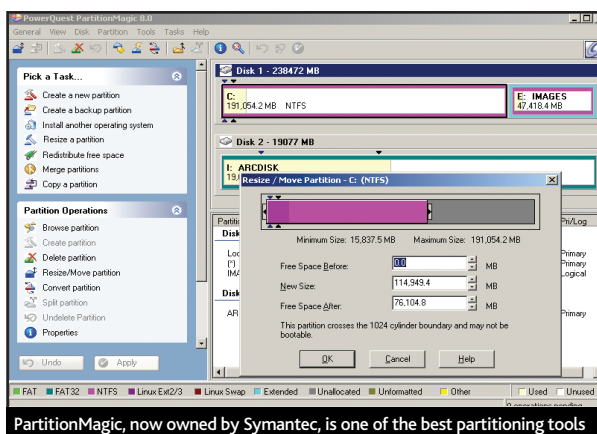
HOW TO... MOVE THE PAGE FILE



1 Right-click My Computer, choose Properties and click on the Advanced tab. Under Performance, click the Settings button and then click the Advanced tab again. Under the Virtual Memory section, click the Change button. Click on the entry for the C:\ drive and choose the No paging file option.



2 Click on the entry for one of your other hard disks and choose the Custom Size option. Set the minimum size to one and a half times the amount of RAM you have in your system. Set the maximum size to three times the amount of RAM you have in the system. Click Set, then OK and restart your system.



Partition Magic, now owned by Symantec, is one of the best partitioning tools

but that's no problem for Windows users as you simply need to download the ISO image for the System Rescue CD from www.sysresccd.org and follow the instructions for resizing NTFS partitions at <http://mlf.linux.rulez.org/mlf/ezaz/ntfsresize.html#example>.

The program is easy to use, but make sure you read the instructions carefully or you may end up with a system that won't boot. If you're not sure what you're doing, go for one of the commercial tools instead.

THE PAGE FILE

Windows XP can address up to 4GB of memory but in reality few people have that much RAM in their PC. Sometimes a program that is processing one or more very large files will fill the available memory and require more.

When this happens Windows moves part of the data that's being processed to a reserved area on the hard disk. This area of 'virtual memory'

is called the page file. To make Windows run as fast as possible there are a few things you can do to optimise your PC's page file.

For the utmost efficiency you should move the page file to a hard disk other than the one on which Windows is installed. Ideally, it should be a fast hard disk such as Western Digital's 10,000rpm serial ATA Raptor drive. If you really want to go to town the page file should be the only thing on it. If you don't have £116 spare, though, you could use a 7,200rpm hard disk instead.

The internal workings of hard disks haven't improved

enormously over the past few years, but we wouldn't recommend using an old disk for your page file. You'll need a disk with 80GB platters that spin at 7,200 revolutions per minute to see an improvement. In the walkthrough above we show you how to move your page file to a new hard disk.

However, there is a reason why you might want to leave a small page file on your system disk. When Windows crashes it creates a file called Memory.dmp, which contains the contents of your RAM at the time of the crash. It then saves this to the page file on drive C:\. If you think that you might need these Memory.dmp files, you should leave a page file on the system disk that is the same size as the amount of RAM fitted in your PC – in our case 512MB.

CREATING A MULTIBOOT SYSTEM

A multiboot PC has two or more working operating systems installed at once. When you start a multiboot system you can choose to boot into any

of these operating systems. Using just the tools built into Windows XP you can create a multiboot system that runs any or all previous Microsoft operating systems. But there are a few catches.

Each operating system must be installed on its own partition. If you want to install anything older than Windows 2000, the older operating system must be installed on the first partition on your hard disk. If it isn't, all your partitions, including the one on which Windows XP is installed, must be formatted using FAT32 or FAT16. This means you lose the security advantages of using NTFS, such as being able to restrict the access of some users to specific folders and files.

Finally, you have to install the oldest operating system first. If you try to install an older version of Windows when Windows XP is already in place, you usually end up with a Windows XP system that won't boot – or no bootable operating systems at all.

If you're prepared to do a little tweaking, however, you can get round some of these limitations. We'll deal with the easiest first. If you try to install Windows 2000 after Windows XP, when you restart you'll be offered the choice of booting into either operating system. Try to boot into Windows XP, however, and an error message will tell you that the operating system can't boot.

This is easy to fix. You need to copy the files ntdlr and ntddetect.com from the Windows XP CD to the C:\ drive of your PC. To do this, boot from your Windows XP installation CD and, instead of running the install routine, open the Recovery Console by pressing the R key when prompted. This brings up a DOS-style screen. Now type the following:

```
copy x:\i386\ntldr c:\ (where x is the drive letter of your optical drive)
copy x:\i386\ntddetect.com c:\
```

As you copy each file, you're asked if you want to overwrite the version that already exists on your C:\ drive, to which you should answer Yes. Once you have done this, take the Windows XP CD out of the drive and boot into Windows 2000. Make sure the Windows XP partition is set as active in the Microsoft Management Console. Now restart your PC and both operating systems will work.

Installing Windows 98 or Me after Windows XP is possible but much trickier. We demonstrate the steps you need to follow on the next page.

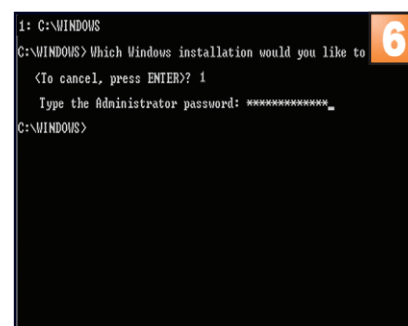
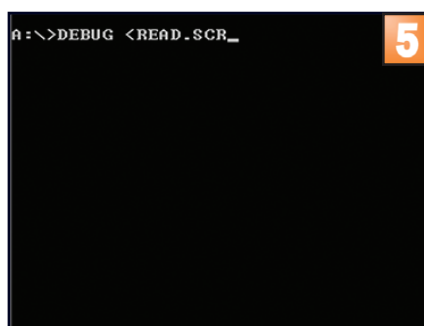
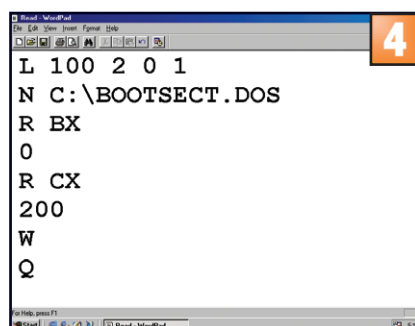
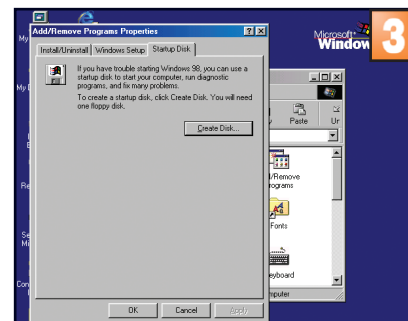
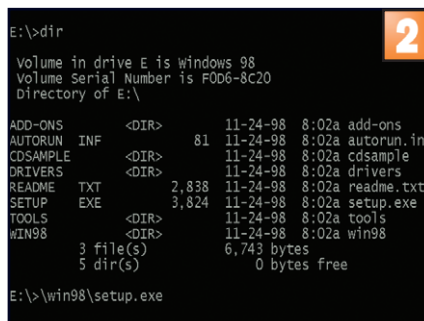
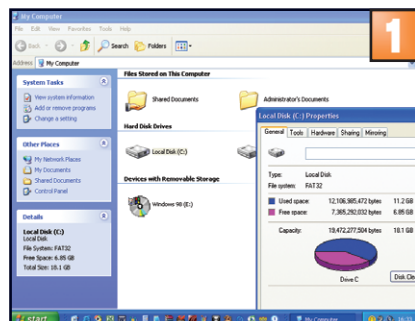
Once you have managed to run Windows 98 alongside Windows XP you may want Windows 98 to be able to read any NTFS partitions on your system. This will allow both operating systems to share files. To enable your Windows 98 installation to read Windows XP's NTFS volume we recommend NTFS for Windows 98, which you can download for free from www.sysinternals.com. It allows you only to read NTFS files, but if you want to alter any file you can copy it to the Windows 98 FAT32 partition and edit it there.

CLONING YOUR HARD DISK

Cloning a hard disk is a great idea if you want a complete backup of a drive or partition. It's particularly useful if you want to copy your Windows partition, complete with all your applications. If something goes wrong with your main installation, you can restore it from the cloned version and get a perfect copy. You'll save hours



HOW TO... INSTALL WINDOWS 98 ON AN XP PC



The best way to get Windows 98 or Me running on a Windows XP system is to install the older operating system first. If you already have a working Windows XP installation, however, this is a real pain. Here we show you how we installed Windows 98 alongside an existing XP installation.

1 We started with a fairly old installation of Windows XP that had been in use for a couple of years. There were two partitions on the drive, both of which were formatted with the FAT32 file system. It's important that the Windows XP partition is formatted with FAT32, otherwise what we're trying to do won't work.

2 Boot your PC from the Windows 98 CD. Don't run the install routine but choose to boot from the CD with CD-ROM

support. Run the setup.exe file from the folder win98 by typing `e:\win98\setup.exe`, where 'e' is the letter of your optical drive.

When prompted, choose to install to the FAT32 partition that doesn't have Windows XP on it. Reboot and Windows 98 should load.

3 At this stage we need to repair the boot loader. To do this, you need to create a Windows 98 boot disk. Insert a blank floppy into your A: drive and open the Add/Remove Programs Control Panel. On the Startup tab click the Create Disk button.

4 Open Notepad. Copy the text shown in picture 4 into Windows Notepad and save that file as READ.SCR. Copy READ.SCR to the bootable Windows 98 startup floppy disk. Start your PC from this disk.

5 From the DOS prompt, run the following command: `DEBUG <READ.SCR`. This creates a system file that Windows 98 needs to boot. We'll need this later. To repair the Windows XP boot loader you must boot from your Windows XP installation CD and, instead of starting the installation, press R when prompted to access the Recovery Console.

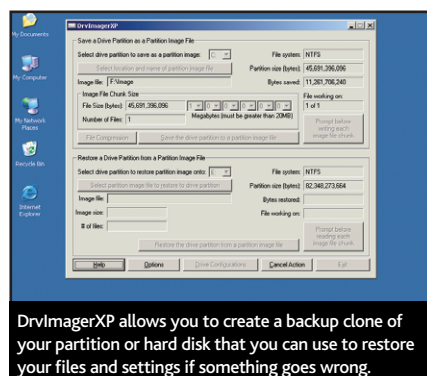
6 You'll be asked which Windows XP installation you want to access. Choose the only one available and enter your Administrator password. When you get to the C:\WINDOWS prompt, type `FIXBOOT` and press Enter. This repairs the boot sector of your Windows XP installation. Now remove the Windows XP installation CD from the drive and reboot. You should now be offered the choice of booting into Windows 98 or XP.

because you won't have to reinstall anything.

When you clone a hard disk or partition you make an exact copy of it to another hard disk or other type of storage such as a DVD. This copy includes all the essential files your PC needs, such as the master boot record, a reserved area of the hard disk containing information that your PC needs to boot.

There are plenty of easy-to-use applications you can buy that will clone either a disk or a partition for you. Norton Ghost and Acronis True Image are both good examples. They costs between £25 and £30 each and let you boot the PC using their installation CDs. They then display friendly control screens that enable you to restore a cloned backup in minutes.

If that sounds too easy or expensive, you could try DrvImagerXP. It's one of the only free disk-



DrvImagerXP allows you to create a backup clone of your partition or hard disk that you can use to restore your files and settings if something goes wrong.

cloning tools that runs under Windows. Most of the others have to be run from a bootable floppy disk. DrvImagerXP works with Windows 2000 and XP.

Without using compression to save space it backed up our 40GB partition in about half an hour. With compression, the same job took about an hour, but the resulting image file was only 3.29GB in size.

Restoring an image with DrvImagerXP is simple. You open the program, select the image file and tell the program which drive or partition to restore it to. You can download DrvImager XP from www.softpedia.com.

HAPPY HARD DISKS

A properly set-up hard disk is a happy hard disk, and if you put our tips and tricks into practice you will reap the rewards. Your PC will be faster, you'll be able to switch between versions of Windows and you can relax safe in the knowledge that if you completely mess something up you'll be able to recover your system using a clone of